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CR-131218

Subject: Type II Progress Report for ERTS-1

Period Covered: November, December, 1972 and January, 1973

A. Title: Investigation to Develop a Multistage Forest Sampling Inventory
System Using ERTS-1 Imagery; PR-126

B. Principal Investigator: Philip G. Langley
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C. Problems Impeding Investigation:

None at present. Have received no color composite material. Some bulk
tapes received 9 Feb 1973. If this material is not received within the
next two weeks, progress will be delayed. The only usable material received
to date from standing orders are the 70mm negative and positive transparencies.
All the 9 1/2 x 9 1/2 inch material received on standing orders is too dark
to be usable for interpretation work. The B&W 9 1/2 x 9 1/2 inch material
received via retrospective orders is more usable.

D. Accomplishments:

1. This Period
 - a. U-2 Imagery

1. An analytic strip and block adjustment has been completed for two
strips of 6 inch 1/125,000 scale photography taken with the Wild RC-10
camera. This adjustment was performed to (1) obtain control parameters for
use in resectioning each U-2 image for the purpose of projecting the bound-
ary corners of primary sampling units and county boundaries into the image
coordinate systems, and (2) obtain the ground coordinates of a set of
control points to be used for the resectioning of two ERTS-A images covering
the study area.

2. Computer programs have been written to assemble the control data by
U-2 image number and perform the resectioning. We have completed the
digitizing of property corners and primary sampling units and we are now
ready to plot them into the U-2 image coordinate systems. There are about
3,500 property corners in the study area for which overlay templates must be
prepared.

b. ERTS-1 Resectioning Programs

Last period, the preliminary ERTS-1 resectioning program was completed.
This period a polynomial adjustment routine was added to correct for dif-
ferences between perspective geometry and the MSS scanner.

E73-10428) INVESTIGATION TO DEVELOP A
MULTISTAGE FOREST SAMPLING INVENTORY
SYSTEM USING ERTS-1 IMAGERY Progress
Report, Nov. 1972 (Earth Satellite Corp.,
Berkeley, Calif.) 4 p HC \$3.00 CSCL 02F
N73-20389
Unclas
00428
G3/13

This program will provide the transformation constants for projecting primary sampling unit corners into the ERTS-1 MSS image system.

c. Analysis of Data From IMANCO Machine

Last period, data were obtained for 321 land parcels in Trinity County by means of an IMANCO image analyzing computer. This period, some analyses of the data were completed with uncertain results. Preliminary trials were performed using principal components and the method of moments to compress the data into a usable number of regression variables. Using the full data set of 167 one-line sample strips, the maximum correlation found between the machine derived variables and timber volume predictions, obtained from large scale 70mm color photographs, was only .48. After a systematic removal of 34 of the worst outliers, a multiple correlation coefficient of .76 was achieved with the method of moments. No significant change in the variable means was suffered by the removal of outliers. However, the cause of the high variation encountered in the full data set would have to be determined before definite conclusions could be reached as to the usefulness of IMANCO machine for the present purpose. From what we have learned so far, we will modify our techniques for using the machine and attempt to read data from the U-2 imagery. Then we will progress to the ERTS-1 imagery.

2. Plans for Next Period

- a. Complete the analysis of IMANCO data from the 1/40,000 scale B&W photos.
- b. Begin reading the U-2 photos on the IMANCO machine.
- c. Apply the resectioning programs to the U-2 and ERTS-1 images. Then project the corner coordinates of the sampling units into the image coordinate systems.

E. Significant Results

1. Two strips of U-2 RC-10 images (22 photos) were analytically triangulated and adjusted. Control points and pass points were marked on glass plates made from B&W copy negatives of IR color transparencies. A Wild PUG-3 and TAl/p Monocomparator were used to mark and measure the points on the glass plates. Each plate was measured twice in the same orientation for a check on accuracy and operator error.

The 22 photographs were adjusted to 41 ground control and tie points and the block adjustment was performed in a secant plane coordinate system to eliminate the effect of earth curvature. Standard deviations of the residuals of the control and tie points were 12.8 m, 10.8 m and 4.5 m for the X, Y and Z coordinates respectively. The 12.8 m and 10.8 m figures correspond to an identification accuracy of 0.1 mm on the U-2 RC-10 plates.

The standard deviations of the residuals encountered in the ERTS-1 resectioning were (1) 0.16 mm assuming uncorrected perspective geometry and (2) 0.12 mm when the polynomial adjustment was added in. These results

indicate a reduction of 0.11 in the mean square error due to the polynomial adjustment.

F. Publications

No publications were released during this period.

G. Recommended Changes

No major changes in procedure are presently recommended. However, some changes may be recommended in our upcoming data analysis plan.

H. Changes in Standing Order Forms

None during this period.

I. ERTS Image Descriptor Forms

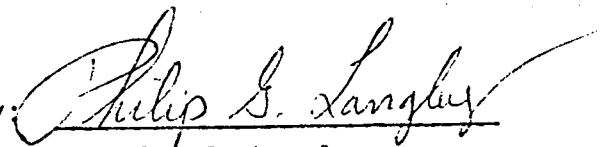
See attachments.

J. Data Request Forms

A request form for MSS bulk color composites of two frames was submitted on December 18, 1972. These have not been received as of this date.

Request forms for bulk and precision MSS digital tapes were submitted on December 26, 1972. The bulk tapes only were received on February 9, 1973.

Submitted by:



Philip G. Langley
Principal Investigator
PR 126

February 9, 1973

(See Instructions on Back)

ID _____

ORGANIZATION Earth Satellite Corporation

PRODUCT ID (INCLUDE BAND AND PRODUCT)	FREQUENTLY USED DESCRIPTORS*			DESCRIPTORS
	Agric.	Forest	Rangeland	
1004 18215 X		X	X	Brush, timberline
1004 18221 X	X	X	X	Volcano, brush, timberline
1094 18222 X		X	X	Brush, snow, timberline
1094 18224 X	X	X	X	Volcano, brush, snow, timberline

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